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Most second language acquisition research has concentrated on learners' speech. This paper argues that it is necessary to look at both learners' speech and gesture in order to better understand second language acquisition. It provides a summary of the second language acquisition process and the types of studies that have been conducted in the field. It discusses how gesture can be used to investigate learners' thinking for speaking.

1. Introduction: McNeill's Theory

Traditionally, language has been viewed as encompassing only speech. Bodily movements including gestures have been viewed as paralinguistic accessories to language, not part of it. McNeill's theory (1992, 2005) of language is revolutionary in this regard. He argues that speech and gesture arise from the same underlying mental process and are a single-integrated system. According to his theory, both speech and gesture develop from a 'growth point' that has both imagistic and verbal aspects. McNeill (2005:25) proposes a model for verbal thought—"a 'language-imagery' or language-gesture dialectic"—in which the static and dynamic dimension aspects of language are combined.

1.1 McNeill's Methodology

To test this theory and study the relationship between language and thought, McNeill (1992) developed a methodology for analyzing natural discourse that includes the observation of both speech and gesture. According to Vygotsky (1986), the relationship between thought and language is an internal process, with a continual movement back and forth from thought to language and vice versa. Vygotsky pointed out that the only way to study internal processes is to externalize them experimentally. The methodology that McNeill developed does just that. By focusing attention on both speech and gesture, it gives analysts an enhanced window onto the mind through which they can observe mental representations and processes (McNeill, 1992).

The methodology has been used by McNeill and other researchers to examine aspects of speech and gesture within various populations, such as

children and adult native speakers of different languages, and individuals with disorders of language or spatial cognition due to hemispheric brain damage. It has been used to explore whether there are any changes in speech and gestures when the narrator is talking to one person or two other people and to strangers or friends. In addition, it has been used to test Slobin's (1991) 'thinking for speaking' hypothesis among native language speakers (McNeill, 1997; McNeill & Duncan, 2000) and applied to second language acquisition to investigate second language learners' thinking-for-speaking patterns (see citations in Stam, 2006b).

2. Second language acquisition

2.1 The second language acquisition process

Learning a language involves not only learning linguistic forms, but learning how to use these forms appropriately in different contexts. Being proficient in a language includes knowing what needs to be marked and expressed in the language versus what can be inferred by listeners (Berman & Slobin, 1994). Slobin (1991) has proposed that speakers learn a particular way of thinking for speaking in first language (L1) acquisition, and Stam (1998) has proposed that second language learners may have to learn another way of thinking for speaking in order to be proficient in their second language (L2).

The notion that second language acquisition involves the learning of different patterns of thinking for speaking is an important concept to consider. Cross-linguistic research on the expression of motion events has established that speakers of typologically different languages have different patterns of thinking for speaking about motion and spatial relations (see Stam, 2006a, for representative studies). Therefore, in order to express motion and spatial relations in their L2 as native speakers would, learners whose first languages are typologically different (Talmy, 1985) from their second languages need to learn other patterns of thinking for speaking.

Second language acquisition is similar to first language acquisition in that learners pass through a number of developmental stages just as children do in acquiring their first language (Dulay & Burt, 1974; Bailey, Madden, & Krashen, 1974). Despite this similarity, the two processes differ. In second language acquisition, learners have already mastered the grammatical structures and semantic distinctions of one language. Also, depending on the L2 learners' age, the second language acquisition process may not play the same role as the first language acquisition process does in social and cognitive development (Klein, 1986).

In addition, learners' first languages frequently have an influence on their acquisition of a second language. There may be both positive and negative transfer in morphology, phonology, syntax, semantics, and the lexicon. Furthermore, learners may have patterns of thinking for speaking about temporality, space, and direction derived from their first language (Slobin, 1996;

Berman & Slobin, 1994; McNeill & Duncan, 2000) that can affect their acquisition of a second language. Slobin has claimed that many language patterns acquired in childhood are "resistant to restructuring in adult second language acquisition" (Slobin, 1996:89), and Kellerman (1995) has proposed in his 'transfer to nowhere principle' that adult second language learners may not even be aware of how languages vary and may learn L2 linguistic forms, but apply them from an L1 perspective.

2.2 Learners' interlanguage systems

In the process of acquiring a second language, learners develop their own language systems, often termed interlanguage systems, (Lightbown & Spada, 1999; Gass & Selinker, 1992; Klein & Perdue, 1997). These systems include aspects of the learners' previously learned languages, aspects of the target language, and aspects that tend to occur in all interlanguage systems, such as the simplification and omission of function words (Lightbown & Spada, 1999). The systems are influenced by the typological differences in grammatical categories, form and meaning, and 'conceptual organization' between the previously learned languages and the new language (Ramat, 2003:14). Interlanguage systems are dynamic. They change as learners become more proficient in their L2, although the degree to which they change varies. Some learners may fossilize in their grammatical development while continuing to add vocabulary; others may continue to develop grammatically.

Because it is difficult to view the rules and structures learners have internalized, production errors have been used to assess learners' language systems (Ellis, 1986). Although this method has merit, it does not provide a full picture of learners' language systems because learners may produce grammatically correct utterances, but do so from an L1 perspective (Klein, 1986). To have a complete picture of learners' progress in acquiring their L2, it is necessary to look at both their speech and gestures (Stam, 2006a, 2006b). Alone speech tells us whether learners can produce utterances, but not how they are thinking. Gestures provide this additional information. By looking at what gestures produce and where the gestures co-occur with speech, we can determine what learners are thinking and whether they are thinking in their L1 or in their L2.

2.3 Gesture and nonverbal communication in L2 acquisition research

Second language acquisition research has been concerned with the second language acquisition process, the learner, and factors that affect the acquisition process. As a field of study, it grew out of classroom language teaching following World War II and the Contrastive Analysis Hypothesis, a behaviorist theory which viewed all errors in the L2 as the result of interference from the learner's L1 (Newmeyer & Weinberger, 1988).

Since the inception of second language acquisition as a field, research has concentrated on contrastive analysis, error analysis, performance analysis, discourse analysis, language transfer, input, and learner variation (see Larsen-Freeman, 1991 for a review of the first twenty-five years of second language acquisition research.). Among the issues[1] that have been explored are child and adult second language acquisition, differences between acquisition and learning, social and psychological factors affecting second language acquisition, age and the critical period hypothesis, formal (classroom) and informal language acquisition, interlanguage and transfer, and communication strategies (see Stam, 2006a for representative studies). The majority of this research has focused on learners' spoken or written language not their speech and gestures.

However, in the last thirty years, there have been a growing number of papers and empirical studies[2] that have considered nonverbal communication and gesture and their place in second language and foreign language teaching and research. Some (Sainsbury & Wood, 1977; Marcos, 1979; Nobe, 1993) looked at how language fluency affects the frequency of gesturing of subordinate bilinguals and foreign language learners and found that speakers produce more gestures in their nondominant language than their dominant one. Some (Neu, 1990; Kellerman, 1992; Jungheim, 1995) argued that communicative competence in a foreign or second language involved more than just linguistic competence while others (von Raffler-Engel, 1980; Wylie, 1985; Pennycook, 1985) advocated for the teaching of kinesics, emblems, and proxemics in the foreign and second language classroom.

In addition, several have empirically investigated the relationship between speech and gesture in L2 acquisition. Gullberg (1998) examined foreign language learners' use of gestures as communication strategies and found that learners used gestures to elicit words; clarify problems of co-reference; and signal lexical searches, approximate expressions, and moving on without resolution. Sherman and Nicoladis (2004) looked at whether advanced L2 learners used more symbolic gestures in their L1 and more deictic gestures in their L2 and found that the learners used more deictic gestures per word in their L2, but did not use more symbolic gestures in their L1. Within a Vygotskian framework, McCafferty explored the role of gesture in L2 acquisition in several different contexts. He (McCafferty, 1998) examined the relationship between L2 gesture and private speech and found that almost all forms of object-regulated and other-regulated private speech had accompanying gestures, while only one form of self-regulated private speech did. With Ahmed (McCafferty & Ahmed 2000), he investigated whether Japanese learners of English would acquire gestures of the abstract under exposure to English in naturalistic and instruction-only conditions and found that the naturalistic learners acquired the American one-handed container gesture of

[1] The scope of this paper does not permit discussion of all the studies on second language acquisition; therefore, I have provided a sample of the types of issues that have been researched.

[2] See Gullberg, 2006 for additional examples of studies.

the abstract. In addition, McCafferty (2002) examined the interactions of a Taiwanese learner of English and a native English speaker to see how gestures were used in the co-construction of meaning in creating zones of proximal development and how the same learner used gestures as a mechanism to help him think and organize his discourse (McCafferty, 2004).

While these speech and gesture studies have argued that both speech and gesture must be considered in studying second language acquisition, they have not used gestures as a means to investigate learners' thinking patterns as McNeill has done (McNeill, 1992, 1997, 2005; McNeill & Duncan, 2000). This aspect of the McNeillian perspective has been applied to second language acquisition research by the 'thinking for speaking' and gesture in second language acquisition studies.

2.3.1 Thinking for speaking in second language acquisition

Based on Talmy's (1985) classification of languages as verb-framed (e.g., Spanish) or satellite framed (e.g., English), Berman and Slobin (1994) conducted a cross-linguistic study of L1 narrative development to test Slobin's (1991) thinking for speaking hypothesis. They found that linguistically Spanish speakers tend to describe states and elaborate descriptions of settings while English speakers tend to describe processes and accumulate path components, adverb particles and prepositions. McNeill and Duncan (2000) further investigated these patterns of thinking for speaking among native speakers of Spanish and English by looking at both their speech and gesture. They found that there was speech-gesture synchrony in the expression of motion events. Spanish speakers' path gestures tend to fall on the verb and English speakers' path gestures tend to fall on the satellite. This speech-gesture synchrony for native speakers is important as it provides a means by which to investigate second language acquisition.

Stam (1998, 2006a, 2006b), Kellerman and van Hoof (2003), and Negueruela, Lantolf, Rehn Jordan, and Gelabert (2004) used speech-gesture synchrony to explore whether learners' thinking for speaking patterns about motion change when they acquire a second language. All of them looked at native speakers of Spanish and English and Spanish learners of English, and all replicated previous findings regarding native speakers' thinking for speaking patterns in both speech and gesture (McNeill & Duncan, 2000). Specifically, Spanish speakers express path linguistically with a verb and their path gestures tend to fall on the verb, while English speakers express path linguistically with a satellite (an adverb or preposition) and their gestures tend to fall on the satellite.

However, as a consequence of differences in study design, the results of these studies varied regarding L2 learners. Kellerman and van Hoof (2003) and Negueruela et al. (2004) looked only at the frequency of gestures co-occurring with verbs and satellites. Kellerman and van Hoof found that the same percentage of path gestures (65%) of the Spanish learners of English fell on the verb in both their L1 and their L2 narrations while Negueruela et al. found that 23% to 33% of

the path gestures of the Spanish learners of English[3] fell on the verb. Both concluded that the L2 learners were still thinking for speaking in their L1. Stam (2006a, 2006b), on the other hand, looked at the expressions used linguistically to express path, the frequency of gestures co-occurring with motion event speech elements, and the interaction of speech and gesture. She found that the L2 English learners' thinking for speaking patterns had both linguistic and gestural aspects of their L1 and L2 thinking for speaking patterns. Linguistically, L2 learners sometimes expressed path with a satellite in English, but they did not accumulate path components within a single clause in speech with the exception of one learner. Gesturally, there was a decrease in the percentage of path gestures co-occurring with verbs and an increase in the number of path gestures co-occurring with satellites in the learners' L2 narrations compared to their L1 narrations, but the percentages alone were misleading because they did not take into account whether speech elements were present or missing. She also found that there were developmental aspects to the learners' speech and gesture production regarding what aspects of motion events were focused on compared to L1 English speakers (e.g., interiority of ascent versus setting). She concluded that the learners' L2 thinking for speaking patterns both linguistically and gesturally reflected the interlanguage systems that the learners had constructed.

3. Conclusion: Future of second language acquisition research

The application of the McNeillian perspective that speech and gesture are a single-integrated system and that examining gesture as well as speech provides researchers with an enhanced window onto the mind (McNeill 1992, 2000) is still in an emergent stage within the field of second language acquisition. However, as the L2 speech and gesture studies mentioned in this paper illustrate, looking at both learners' speech and gesture holds promise for understanding the second language acquisition process, learners' interlanguage systems, and their thinking for speaking patterns.

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